

## WHAT IS CLAIMED IS:

1        1.    For use in a fixed-size packet switch, a switch fabric  
2 comprising:

3            N input buffers capable of receiving incoming fixed-size  
4 data packets at a first data rate and outputting said fixed-size  
5 data packets at a second data rate equal to at least twice said  
6 first data rate;

7            N output buffers capable of receiving fixed-size data  
8 packets at said second data rate and outputting said fixed-size  
9 data packets at said first data rate; and

10          a bufferless, non-blocking interconnecting network  
11 capable of receiving from said N input buffers said fixed-size data  
12 packets at said second data rate and transferring said fixed-size  
13 data packets to said N output buffers at said second data rate.

1        2.    The switch fabric as set forth in Claim 1 wherein said  
2 bufferless, non-blocking interconnecting network comprises a  
3 bufferless crossbar.

1           3.    The switch fabric as set forth in Claim 1 wherein each of  
2   said N input buffers is at least twice the size of each of said N  
3   output buffers.

1           4.    A method of operating a switch fabric in a fixed-size  
2 packet switch, the method comprising the steps of:

3                storing incoming fixed-size data packets in N input  
4 buffers at a first data rate;

5                outputting the fixed-size data packets from the N input  
6 buffers at a second data rate equal to at least twice the first  
7 data rate;

8                transferring the fixed-size data packets output by the N  
9 input buffers at the second data rate through a bufferless, non-  
10 blocking interconnecting network to N output buffers;

11               storing the fixed-size data packets transferred through  
12 the bufferless, non-blocking interconnecting network in the N  
13 output buffers at the second data rate; and

14               outputting the fixed-size data packets from the n output  
15 buffers at the first data rate.

1           5.    The method as set forth in Claim 4 wherein the  
2 bufferless, non-blocking interconnecting network comprises a  
3 bufferless crossbar.

1           6.    The method as set forth in Claim 5 wherein each of the N  
2   input buffers is at least twice the size of each of the N output  
3   buffers.

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1           7.    A fixed-size data packet switch comprising:

2                N input ports capable of receiving incoming fixed-size  
3 data packets at a first data rate and outputting said fixed-size  
4 data packets at said first data rate;

5                N output ports capable of receiving fixed-size data  
6 packets at said first data rate and outputting said fixed-size data  
7 packets at said first data rate; and

8                a switch fabric interconnecting said N input ports and  
9 said N output ports comprising:

10               N input buffers capable of receiving incoming fixed-  
11 size data packets at said first data rate and outputting said  
12 fixed-size data packets at a second data rate equal to at  
13 least twice said first data rate;

14               N output buffers capable of receiving fixed-size  
15 data packets at said second data rate and outputting said  
16 fixed-size data packets at said first data rate; and

17               a bufferless, non-blocking interconnecting network  
18 capable of receiving from said N input buffers said fixed-size  
19 data packets at said second data rate and transferring said  
20 fixed-size data packets to said N output buffers at said  
21 second data rate.

1           8.    The fixed-size data packet switch as set forth in Claim 7  
2 wherein said bufferless, non-blocking interconnecting network  
3 comprises a bufferless crossbar.

1           9.    The fixed-size data packet switch as set forth in Claim 7  
2 wherein each of said N input buffers is at least twice the size of  
3 each of said N output buffers.

1           10.   The fixed-size data packet switch as set forth in Claim 7  
2 further comprising a scheduling controller capable of scheduling  
3 transfer of said fixed-size data packets from said N input ports to  
4 said switch fabric.

1           11.   The fixed-size data packet switch as set forth in  
2 Claim 10 wherein said scheduling controller is capable of  
3 scheduling transfer of said fixed-size data packets from said N  
4 output ports to an external device.

1           12. The fixed-size data packet switch as set forth in  
2 Claim 10 wherein said scheduling controller is capable of  
3 scheduling transfer of said fixed-size data packets from said N  
4 input buffers to said bufferless, non-blocking interconnecting  
5 network.

1           13. The fixed-size data packet switch as set forth in  
2 Claim 12 wherein said scheduling controller is capable of  
3 scheduling transfer of said fixed-size data packets from said N  
4 output buffers to said N output ports.

1           14. A communication network capable of transferring data in  
2 fixed-size packets between a plurality of end-user devices, said  
3 communication network comprising:

4           a plurality of fixed-size data packet switches, at least  
5 one of said fixed-size data packet switches comprising:

6           N input ports capable of receiving incoming fixed-  
7 size data packets at a first data rate and outputting said  
8 fixed-size data packets at said first data rate;

9           N output ports capable of receiving fixed-size data  
10 packets at said first data rate and outputting said fixed-size  
11 data packets at said first data rate; and

12           a switch fabric interconnecting said N input ports  
13 and said N output ports comprising:

14           N input buffers capable of receiving incoming fixed-  
15 size data packets at said first data rate and outputting said  
16 fixed-size data packets at a second data rate equal to at  
17 least twice said first data rate;

18           N output buffers capable of receiving fixed-size  
19 data packets at said second data rate and outputting said  
20 fixed-size data packets at said first data rate; and

21           a bufferless, non-blocking interconnecting network  
22 capable of receiving from said N input buffers said fixed-size

23 data packets at said second data rate and transferring said  
24 fixed-size data packets to said N output buffers at said  
25 second data rate.

1 15. The communication network as set forth in Claim 14  
2 wherein said bufferless, non-blocking interconnecting network  
3 comprises a bufferless crossbar.

1 16. The communication network as set forth in Claim 14  
2 wherein each of said N input buffers is at least twice the size of  
3 each of said N output buffers.

1 17. The communication network as set forth in Claim 14  
2 further comprising a scheduling controller capable of scheduling  
3 transfer of said fixed-size data packets from said N input ports to  
4 said switch fabric.

1 18. The communication network as set forth in Claim 17  
2 wherein said scheduling controller is capable of scheduling  
3 transfer of said fixed-size data packets from said N output ports  
4 to an external device.

1           19. The communication network as set forth in Claim 17  
2 wherein said scheduling controller is capable of scheduling  
3 transfer of said fixed-size data packets from said N input buffers  
4 to said bufferless, non-blocking interconnecting network.

1           20. The communication network as set forth in Claim 19  
2 wherein said scheduling controller is capable of scheduling  
3 transfer of said fixed-size data packets from said N output buffers  
4 to said N output ports.